Delaware Electric Cooperative
Generator Interconnection Application –Long Form
(For Use with Generators Greater than 100 kW)

An applicant (Generator Owner) makes application to Delaware Electric Cooperative to install and operate a generating facility greater than 100 kW interconnected with the Delaware Electric Cooperative utility system.

Section 1, Applicant Information Directly Interconnected to the Generating System

Is the following system: ☐ **Leased** **or** ☐ **Member Owned**

Type of Application: ☐ **Initial** **or** ☐ **Addition/Upgrade**

Name: Vincent Pennell

Mailing Address: 1947 Central Church Rd.

City: Dover State: DE ZipCode: 19904

Email Address: vincent.d.pennell@gmail.com

Facility Location (if different from above): _____

Telephone: Area Code 302 Number 670-4703 (Cell) Area Code ____ Number _____

Delaware Electric Cooperative Account No.: New Service Rate Code: _____

Section 2, Equipment Contractor

Name: Sunrise Solar, Inc.

Mailing Address: PO Box 898

City: Chestertown State: MD ZipCode: 21620

Email Address: dan@sunrisesolarmd.com Telephone (Daytime): Area Code 410 Number 708-4824

Section 3, General Service Requirements

If different from the existing service, what size service will the generation facility require?

☐ 200A ☒ 400A ☐ 600A ☐ 800A ☐ Primary Metered

If this is a new account for a Solar System, what Voltage/Phase will be required?

☐ 120/240V-1Ph ☐ 120/208V-1Ph ☐ 120/208V-3Ph ☒ 277/480V-3Ph

Section 4, Application Fee

This application fee is applicable for all new PV applications received on or after May 20, 2016. The cost will be $50.00 per application (new and/or upgrade) for systems 25 kW DC or less. For systems over 25 kW DC the fee will be $50.00 plus $1.00 kW DC over 25 kW DC. All interconnection applications submitted to DEC shall be accompanied with the appropriate fee made out to Delaware Electric Cooperative and are non-refundable. No applications will be considered without the fee.

$265

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Section 5, Generator Type

Is Generator powered from a Renewable Energy Source: [X] Yes [ ] No

Type of Energy Source (if applicable): [X] Solar [ ] Wind [ ] Other

Other generator energy source: [ ] Diesel, Natural Gas [ ] Diesel, Fuel Oil [ ] Other: _____

Will excess power be exported to Delaware Electric Cooperative? Yes [x] No [ ]

Total Aggregated Maximum Load: 281.4 / 240 kW DC/AC (Typical) Maximum Export: 281.4 / 240 kW DC/AC

Forecast Annual kWh: 387,208 (Note: The Annual Forecast MUST be completed using **4.5 peak sun light hours per days**)

Section 6, Generator Technical Information

Please fill out the Initial Rating information if there is currently no generating facility on-site. If adding a generating facility to an existing facility, fill out the Initial Rating Information, the Added Rating Information and the Total Rating Information

Type of Generator: [ ] Synchronous [ ] Induction [X] DC Generator or Solar with Inverter

Generator (or solar collector) Manufacturer, Model Name & Number: Sunpower P series 350 watt
(A copy of Generator Nameplate and Manufacturer's Specification Sheet may be substituted)

Inverter Manufacturer, Model Name & Number (if used): Delta 80 kw Inverters
(A copy of Inverter Nameplate and Manufacturer's Specification Sheet may be substituted)

Nominal Voltage Setting 480 (V) Max Reconnect Voltage Setting 480 (V)

Initial Rating:
DC System Design Capacity: 281.4 (kW) 281.4 (kVA)
Inverter Capacity: 240 (Maximum AC kW)
AC System Design Capacity: 240 (kW) 240 (kVA)

Added Rating:
DC System Design Capacity: _____ (kW) _____ (kVA)
Inverter Capacity: _____ (Maximum AC kW)
AC System Design Capacity: _____ (kW) _____ (kVA)

Total Rating (Existing and New):
DC System Design Capacity: 281.4 (kW) 281.4 (kVA)
Inverter Capacity: 240 (Maximum AC kW)
AC System Design Capacity: 240 (kW) 240 (kVA)

Generator Characteristic Data (for rotating machines):
(Not needed if Generator Nameplate and Manufacture's Specification Sheet is provided)

Direct Axis Synchronous Reactance, X_d: _____ P.U. Negative Sequence Reactance: _____ P.U.

Direct Axis Transient Reactance, X'_d: _____ P.U. Zero Sequence Reactance: _____ P.U.

Direct Axis Subtransient Reactance, X''_d: _____ P.U. kVA Base: _____

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Section 7, Interconnecting Equipment Technical Data

Will an interposing transformer be used between the generator and the point of interconnection? ☐ Yes ☒ No

Transformer Data (if applicable, for Customer Owned Transformer):
(A copy of transformer Nameplate and Manufacturer's Test Report may be substituted)

Size: _____ KVA . Transformer Primary : _____ Volts ☐ Delta ☐ Wye ☐ Wye Grounded

Transformer Secondary: _____ Volts ☐ Delta ☐ Wye ☐ Wye Grounded

Transformer Impedance: _____% on _____ KVA Base

Transformer Fuse Data (if applicable, for Customer Owned Fuse):
(Attach copy of fuse manufacturer's Minimum Melt & Total Clearing Time-Current Curves)

Manufacturer: _____ Type: _____ Size: _____ Speed: _____

Interconnecting Circuit Breaker (if applicable):
(A copy of breaker's Nameplate and Specification Sheet may be substituted)

Manufacturer: _____ Type: _____ Load Rating: _____ (Amps) Interrupting Rating: _____ (Amps) Trip Speed: _____ (Cycles)

Circuit Breaker Protective Relays (if applicable):
(Enclose copy of any proposed Time-Overcurrent Coordination Curves)

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting:_____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting: _____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting:_____

Current Transformer Data (if applicable):
(Enclose copy of Manufacturer's Excitation & Ratio Correction Curves)

Manufacturer: _____ Type: _____ Accuracy Class: _____ Proposed Ratio Connection: _____/5

Manufacturer: _____ Type: _____ Accuracy Class: _____ Proposed Ratio Connection: _____/5

Generator Disconnect Switch:
A **lockable** disconnect device shall be installed within 3 feet of the DEC meter and accessible at all times by DEC personnel, by and at the cost of the owner.

Manufacturer: SQ D Type: Fuseable Catalog No.: H365 Rated Volts: 480 Rated Amps: 400

Single or 3 Phase: 3 Mounting Location: By Meter

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Section 8, General Technical Information

Enclose copy of site One-Line Diagram showing configuration and interconnection of all equipment, current and potential circuits and protection and control schemes. Is One-Line Diagram Enclosed?: Yes [X]

Enclose copy of any site documentation that describes and details the operation of the protection and control schemes. Is Any Available Documentation Enclosed?: Yes [X]

Enclose copies of schematic drawings for all protection and control circuits, relay current circuits, relay potential circuits, and alarm/monitoring circuits. Are Schematic Drawings Enclosed?: Yes [X]

Section 9, Aggregated Meter Information (If Applicable)

The following aggregated accounts shall be ranked according to the order in which credits shall be applied (We don't apply the credit; however, DEC may elect to make payment to the account serving the Generating System) Additionally, the following accounts must be active accounts and will be used to determine the total 2-year Annual Average kWh to ensure the new system is in compliance with DEC tariff.

1 - DEC Member Name Vincent Pennell Rate Code: 1C2

DEC Account No.: 1408904 Capacity (DEC): _____ 2 Yr Annual Average kWh: 8,000

2 - DEC Member Name Vincent Pennell Rate Code: 1E1

DEC Account No.: 1409004 Capacity (DEC): _____ 2 Yr Annual Average kWh: 19,500

3 - DEC Member Name Vincent Pennell Rate Code: 1P1

DEC Account No.: 12793600 Capacity (DEC): _____ 2 Yr Annual Average kWh: 193,000

4 - DEC Member Name Vincent Pennell Rate Code: 5P1

DEC Account No.: 12234700 Capacity (DEC): _____ 2 Yr Annual Average kWh: 165,500

Any additional meters associated with this aggregated system must be supplied on a separate sheet in the same format.

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Section 10, PJM Interconnection Queue

The Generator Owner must submit a Generation Interconnection Request directly to PJM if: any Generation is designated in whole or in part as a Capacity Resource to PJM or, if generator intends to sell output to another entity at another electrical location. Generation which is operating "behind the meter" in isolation from the PJM bulk power transmission system and which does not intend to participate in the PJM wholesale energy market may not need to apply to the PJM interconnection queue. PJM has sole discretion on interconnection queue requirements.

Prior to installation send the completed Pages 1-3 to Delaware Electric Cooperative, Attn: Troy Dickerson, Manager of Engineering: Phone: (302) 349-3125 Email: tdickerson@decoop.com or mail to P.O. Box 600 Greenwood, DE 19950

Section 11, Preliminary Approval to Proceed with Interconnection

Delaware Electric Cooperative: ☐ Has Approved ☐ Has Not Approved this Preliminary Application.

Name :_____ Date: _____

Signature: _____

Reason of Not Approving: _____

_____

Section 12, Installation Details

Generating System will be installed by: ☐ Owner ☒ State Licensed Electrician

Installing Electrician: _____ Firm: _____ License No.: _____

Mailing Address: _____

City: _____ State:_____ Zip Code: _____

Telephone with Area Code: _____

Installation Date: _____ Interconnection Date: _____

Supply certification that the generating system has been installed and inspected in compliance with the local Building/Electrical code of the municipality of _____

Signed (Inspector): _____ Date:_____
(In lieu of signature of Inspector, a copy of the final inspection certificate may be attached)

Section 13, Generator/Equipment Certification

Generating systems that utilize inverter technology must be compliant with *IEEE 1547* and *Underwriters Lab. UL 1741.* Generating systems must be compliant with Delaware Electric Cooperative's "*Technical Requirements for Parallel Operation of Member Owned Generation*" document. **The Applicant must certify that the installed generating equipment meets the appropriate preceding requirement(s) and can supply documentation that confirms compliance. Generation cannot be turned on until a Delaware Electric Cooperative representative has performed a site visit, installed a warning label near the service meter, and has authorized the system for interconnection.**

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Section 14, Applicant Signature

I hereby certify that, to the best of my knowledge, all the information provided in the Interconnection Application is true and correct.

Name of Applicant (Printed): _____ Date: _____

Signature of Applicant: _____

Section 15, Approval or Non-Approval

Delaware Electric Cooperative: ☐ Has Approved ☐ Has Not Approved this Interconnection Application.

Name : _____ Date: _____

Signature: _____

Reason of Not Approving: _____

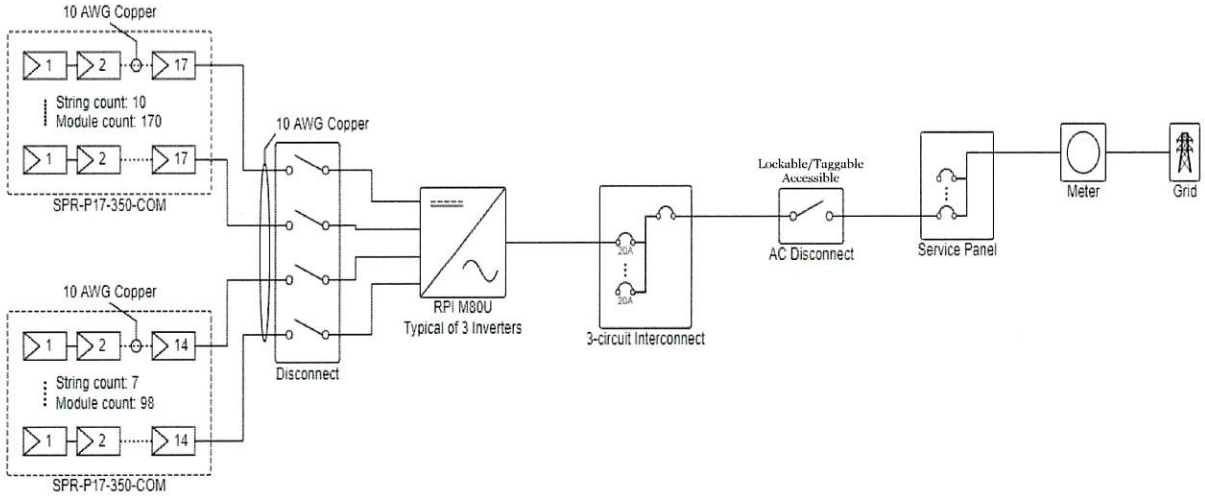
_____

Approval to connect to the Company system indicates only that the minimum requirements for a safe proper interconnection have been satisfied. Such approval does not imply that the Generator Owner's facility meets all federal, state and local standards or regulations.

Section 15, Internal Checks and Notifications

DEC has performed a site visit and approved the system:	☐ Yes
DEC has installed a Warning Label on or near the service meter:	☐ Yes
Notify Billing Dept. of Interconnected Generation:	☐ Yes
Notify Mapping Dept. of Interconnected Generation:	☐ Yes
Notify Metering Dept. of Interconnected Generation:	☐ Yes
Notify System Protection of Interconnected Generation:	☐ Yes

At completion send Pages 5 - 6 to Delaware Electric Cooperative, Attn: Troy Dickerson, Manager of Engineering: Phone: (302) 349-3125 Email: tdickerson@decoop.com or mail to P.O. Box 600 Greenwood, DE 19950



Module Specifications	
804x SunPower SPR-P17-350-COM	
STC Rating	350 W
Vmp	43.1 V
Imp	8.121 A
Voc	51.7 V
Isc	8.651 A

Inverter Specifications	
3x Delta Energy RPI M80U	
Max AC Power Rating	80 kW
Max Input Voltage	1,000 V
Min AC Power Rating	0 W
Min Input Voltage	200 V

Wire Schedule		
Tier	Wire	Length
String	51x 10 AWG	6432ft

Vince Pennell
1947 Central Church Rd
Dover, DE 19904

SUNRISE SOLAR

Sunrise Solar Inc.
6408 Church Hill Rd
Chestertown, MD 21620
410-810-1504

August 20, 2018

The power behind competitiveness

Delta M80U

Grid-tied, 3-phase and transformerless PV Inverter

Product Features

- Two stage topology with wide input operation range, 200 to 1000 Vdc
- Allows 0-90° tilt-mount installation
- Dual MPP tracker inputs
- Superior efficiency performance, 98.8% peak & 98.5% CEC
- Wiring box capable of landing up to 18 strings via fused inputs (_122)
- NEMA 4X outdoor rated enclosure
- Ergonomics grip design
- Integral DC Arc fault detector
- Integral AC & DC disconnects
- Integral type 2 SPDs at AC & DC terminals
- Operating temp. range -25°C to +60°C
- String monitoring

DELTA

Delta Commercial Series

Model		M80U_120	M80U_121	M80U_122
DC Input				
Recommended PV power		104-112 kW [for 125% ≤ (PDC/PAC) ≤ 135%]		
Max. input voltage		1100V (1000V typical for NEC)		
Operating voltage range		200-1000V		
Start voltage		>250V		
MPP voltage range for rated power		600~800V		
Rated voltage		710V		
MPP tracker		2		
Max. operating current / Each MPPT		140A / 70A		
Max. allowable array Isc for each MPPT		108A/MPPT, 216A total		
Connection type		16 pairs of 8~14 AWG fuse holder (Cu/Al wire, 90°C rated)	1~3/0 AWG terminal block (Cu/Al wire, 120°C rated)	18 pairs of MC4 connector (90°C rated)
Type 2 SPD		O	O	O
15A string fuses		O	X	O
DC Switch		O	X	O
String monitoring		X	X	O
AC Output				
Rated output power		80kW		
Max. output power		83kW		
Max. output current		100A		
Rated voltage/grid type		3Ph 480/277V (3P4W/Y) or 3Ph 480V (3P3W/Δ)		
Operating voltage range		±10%		
Operating frequency range		50/60Hz ±5Hz		
Power factor		Unity at rated power, 0.8 ind ~ 0.8 cap adjustable		
Protection		Type 2 SPD		
THD		<3%		
Connection type		1-2/0 AWG terminal block (Cu wire, 90°C rated)		
Night time consumption		<3W		
Efficiency				
Peak efficiency		98.8%		
CEC efficiency		98.5%		
Information				
Communication port		RS-485 (Delta/Solivia or Sunspec Protocol)		
Display		20 x 4 LCD		
Regulation				
		UL1741 SA, UL1741, UL1998, UL 1699B, IEEE1547, IEEE1547.1 CSA C22.2, FCC Part 15 (Class B)		
General Data				
Smart inverter functionality		Voltage/Frequency Ride through, Volt/Var, Volt/Watt, Power curtailment, Frequency/Watt		
Operating temp. range		-13°~140°F (-25°~60°C)		
Protection level		NEMA 4X		
Operating elevation		<9800ft (<3000m)		
Cooling		Forced air cooling plus Smart Fan control		
Dimension (in)		24.2 x 35.4 x 10.8		24.2 x 37.4 x 10.8
Weight (lb)	W/ Wiring box	180.6	171.8	185.2
	W/O Wiring box	149.9		
	Shipping weight	246.9	242.5	251.3

- All specifications are subject to change without prior notice.

DELTA ELECTRONICS, INC.
39 Section 2 Huandong Road,
Shanhua Township,
Tainan County 74144, Taiwan,R.O.C.
TEL 886-6-5056565
FAX 886-6-5051919
http://www.deltaww.com

Smarter. Greener. Together.

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N
400 Amp Solar Panel Box
Disconnect
Bypass
Meter
Service
To 13
N
Central Church Rd.